

♂. 527, 528, 537, 538, 539. ♀. 526, 529, 531, 532, 533, 534, 540. Central Tanegashima. 300'.

♂. 542. ♀. 543, 544. Nishinoomote, Tanegashima. 150'.

3. MICROMYS GEISHA Thos.

♂. 536. ♀. 535, 539, 541. Central Tanegashima. 300'.

These specimens are intermediate, as should be the case, between the long-footed *yakui* and the ordinary *geisha* of Japan. Three of the specimens are measured as having the hind foot 19.5 mm.

EXPLANATION OF PLATE IX.

Mustela melampus bedfordi, p. 343.

4. A Revision of the Fishes of the Family *Galaxiidae*.

By C. TATE REGAN, B.A., F.Z.S.

[Received October 26, 1905.]

(Plates X.-XIII.*)

The Galaxiidae are a family of Teleostean Fishes which are placed by Boulenger in the Haplomi, a suborder defined by the abdominal ventral fins, the persistent pneumatic duct, and the absence of a mesocoracoid element in the pectoral arch.

They may be thus defined :—

Maxillary behind the præmaxillary and toothless, but to a certain extent bordering the mouth. Parietals in contact, separating the frontals from the supraoccipital; orbitosphenoid, basisphenoid, and opisthotic wanting; pro-otics not forming a roof for the eye-muscle canal, which is confluent with the cranial cavity; mesethmoid small, unpaired. Ribs attached to autogenous parapophyses; epipleurals and epineurals present. Post-temporal simple, attached to the epiotic; pectoral pterygoids normal, 4 in number. 5 to 11 branchiostegals; gill-membranes free from the isthmus; pseudobranchiæ present; four gills, a slit behind the fourth. Body naked. No adipose fin. Pectorals placed low; ventrals, if present, with 6 or 7 rays. Air-bladder present. Ova falling into the abdominal cavity before extrusion.

The closely allied Haplochitonidae differ in the greater development of the præmaxillaries, the presence of a roof for the eye-muscle canal, formed by the pro-otics, and in having an adipose fin.

The Esocidae of the Northern Hemisphere resemble the Galaxiidae and Haplochitonidae of the Southern in the primitive structure of the vertebral column, also in the shape of the cranium, the orbitosphenoid wanting and the opisthotic very small or absent. However, the presence of well-developed paired ethmoids and the separation of the parietals by the supraoccipital are cranial differences of considerable importance.

* For explanation of the Plates, see p. 383.

So long as they were supposed to be a fresh-water group, the geographical distribution of the Galaxiidae was considered to be of considerable interest, occurring as they do in the Southern half of Australia, Tasmania, New Zealand and the neighbouring islands, Chile, Patagonia and the Falkland Islands, and at the Cape of Good Hope.

The occurrence of *Galaxias maculatus* in the sea has been recorded by Valenciennes and by Philippi, off the Falklands and off the coast of Chile respectively. The observations of Johnston in Tasmania and of Hutton and Clarke in New Zealand are to the effect that *Galaxias attenuatus* descends to the sea periodically to spawn. Mr. Rupert Vallentin has seen shoals of little fishes, which I identify with the *Galaxias gracillimus* of Canestrini, in the sea at the Falkland Islands. Recently *Galaxias brevipinnis* has also been found to be marine, *G. bollansi*, described by Hutton from the Auckland Islands, proving to be identical with this species.

The Galaxiidae present many analogies to the Salmonidae of the Northern Hemisphere, both being circumpolar groups of marine origin which are establishing themselves in fresh-water. In both families we meet with non-migratory forms which appear to have finally left the sea and with others which return to the sea periodically; but whilst the migratory Salmonidae are anadromous, the migratory Galaxiidae, on the contrary, are catadromous.

The enormous range of variation in the fresh-water Salmonidae renders the delimitation of species a matter of great difficulty, and so it is with the Galaxiidae, with the similar result that a large number of nominal or insufficiently defined species have been described.

In some species numerous small blackish spots on the body and fins, due to the presence of parasitic organisms, are almost always present, and have been mistaken for colour-markings characteristic of the species (e.g. *G. lynx* and *G. olidus*).

The burrowing-habits of a species of *Galaxias* have been recorded by T. S. Hall (Viet. Nat. xviii. 1900, p. 65), who states that, according to the observations of Mr. Russell Ritchie of Launceston, in Tasmania *Galaxias* have been dug up in moist peaty soil, and swim when placed in water. As many as twelve at a time have been dug up in one place and lived in water in a pickle-jar for various periods up to three days. The loss of the ventral fins and the small eyes of the New Zealand *Neochanna apoda*, which burrows in damp clay, show its special adaptation to similar habits.

The material on which the present revision is based consists of the specimens in the British Museum, including all the types described by Richardson and by Günther, as well as a series of specimens from Tasmania, sent by Mr. R. W. Johnston in 1880, representing the species described by him, and typical examples of *G. nigrothorak* Lucas and *G. bollansi* Hutton. A large series of specimens has been received from the Australian Museum, including the types of *G. occidentalis*, *G. waterhousei*, and *G. kayi*.

The author has also been permitted to examine the types of *G. scriba* and *G. ornatus*, preserved in the Paris Museum, and those of *G. attenuatus*, *G. maculatus*, and *G. alpinus*, in the Museum of the University of Cambridge.

The author wishes to gratefully express his thanks to the Director of the Australian Museum, to Mr. E. R. Waite, to Professor L. Vaillant and to Dr. S. F. Harmer. Also to Mr. J. A. Wolffsohn, who has kindly sent him a copy of Philippi's paper describing the Chilian species.

27 species may be regarded as well established, but this number will doubtless soon be augmented. Two genera may be recognised, *Galaxias* and *Neochanna*.

GALAXIAS.

Galaxias Cuv. Règne Anim. ii. p. 183 (1817); Cuv. & Val. Hist. Nat. Poiss. xviii. p. 340 (1846); Günth. Cat. Fish. vi. p. 208 (1866).

Mesites (non Geoffr.) Jenyns, Voy. Beagle, Fish. p. 118 (1842).

Austrocobitis Ogilby, Proc. Linn. Soc. N.S. Wales, xxiv. 1899, p. 158.

Body more or less elongate. Teeth conical, pointed, in a single series in the jaws and on the inner edge of each entopterygoid, and in a double series on the tongue. Eyes small or moderate, with a free circular lid. Dorsal fin more or less posterior in position, with 9 to 15 rays; anal opposite or posterior to the dorsal, with 10 to 19 rays. Ventral fins present, with 6 or 7 rays.

Vertebrae 53 to 64 in number (53 in *G. olidus*, 56 in *G. platei*, 60 to 61 in *G. findlayi*, 61 in *G. fasciatus*, 62 in *G. attenuatus* and *G. maculatus*, 64 in *G. brevipinnis*).

Synopsis of the Species.

I. South African. (Ventrals 6-rayed; dorsal and anal fins each with 9 to 12 rays; cleft of mouth rather small.)

- | | |
|-------------------------------|-----------------------|
| Caudal truncate-rounded | 1. <i>zebratus</i> . |
| Caudal emarginate | 2. <i>punctifer</i> . |

II. South American.

A. 6 or 7 branchiostegals; caudal emarginate; origin of anal opposite or slightly posterior to that of the dorsal.

1. Origin of ventral equidistant from tip of snout and base of caudal or nearer the former.

- | | |
|--|-------------------------|
| Length of head 5 (young) to $6\frac{1}{2}$ (adult) in the length of the fish | 3. <i>attenuatus</i> . |
| Length of head 7 to $7\frac{1}{2}$ (young) in the length of the fish | 4. <i>gracillimus</i> . |

2. Origin of ventral nearer to base of caudal than to tip of snout.

- | | |
|--|-----------------------|
| Maxillary extending to below anterior margin of eye or slightly beyond | 5. <i>maculatus</i> . |
| Maxillary extending to below anterior $\frac{1}{3}$ of eye | 6. <i>alpinus</i> . |

B. 8 or 9 branchiostegals; caudal truncate; origin of anal posterior to that of the dorsal.

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|--|---------------------|
| Origin of ventral considerably nearer to base of caudal than to tip of snout | 7. <i>platei</i> . |
| Origin of ventral slightly nearer to tip of snout than to base of caudal | 8. <i>smithii</i> . |

III. New Zealand and neighbouring islands.

A. Anal fin, when laid back, not reaching the procurent caudal rays.

1. 6 or 7 branchiostegals; 9 to 11 gill-rakers on the lower part of the anterior arch.

Pectoral extending less than $\frac{1}{2}$ of the distance from its base to the base of ventral; anal with 12 to 15 branched rays 3. *attenuatus*.

Pectoral extending more than $\frac{1}{2}$ of the distance from its base to the base of ventral; anal with 10 to 12 branched rays 9. *huttoni*.

2. 8 or 9 branchiostegals; 12 to 14 gill-rakers on the lower part of the anterior arch 10. *lynx*.

B. Anal fin, when laid back, extending to the procurent caudal rays but not to the base of the caudal; 7 to 9 gill-rakers on the lower part of the anterior arch 11. *brevipinnis*.

C. Anal fin, when laid back, extending to or beyond the base of caudal; 10 or 11 gill-rakers on the lower part of the anterior arch.

Length of head 4-5 in the length of the fish (in specimens of 82-215 mm.) 12. *fasciatus*.

Length of head $3\frac{2}{3}$ - $3\frac{4}{5}$ in the length of the fish (in specimens of 163-205 mm.) 13. *alepidotus*.

IV. Australian and Tasmanian.

A. Ventrals 7-rayed.

1. Origin of anal opposite to that of the dorsal.

Anal with 12-15 branched rays 3. *attenuatus*.
Anal with 10 branched rays 14. *occidentalis*.

2. Origin of anal posterior to that of the dorsal, below or in advance of the middle of the dorsal.

a. Origin of ventrals equidistant from tip of snout and base of caudal.

Lower jaw projecting; pectoral extending less than $\frac{1}{2}$ of the distance from its base to the base of ventral 15. *waitii*.

Lower jaw shorter than the upper (in the adult); pectoral extending $\frac{1}{2}$ - $\frac{2}{3}$ of the distance from its base to the base of ventral 16. *weedoni*.

b. Origin of ventrals nearer to base of caudal than to tip of snout; jaws equal anteriorly.

a. Pectoral extending much less than $\frac{1}{2}$ of the distance from its base to the base of ventral 17. *rostratus*.

β . Pectoral extending about $\frac{1}{2}$ of the distance from its base to the base of ventral.

* Maxillary extending to below anterior $\frac{1}{4}$ or anterior $\frac{1}{3}$ of eye.

Length of head $4\frac{3}{5}$ - $4\frac{4}{5}$ in the length of the fish 18. *truttaceus*.

Length of head 4 in the length of the fish 19. *auratus*.

** Maxillary extending to, or nearly to, below middle of eye.

Anal, when laid back, extending to the base of caudal 20. *corii*.

Anal, when laid back, not extending to the base of caudal 21. *affinis*.

3. Origin of anal posterior to the middle of dorsal.

a. Pectoral extending less than $\frac{1}{2}$ of the distance from its base to the base of ventral.

a. Lower jaw slightly projecting 22. *ornatus*.

β . Jaws equal anteriorly or the lower somewhat the shorter.

Caudal peduncle $1\frac{1}{2}$ - $1\frac{3}{4}$ as long as deep 23. *olidus*.

Caudal peduncle $1\frac{1}{2}$ -2 as long as deep 24. *findlayi*.

b. Pectoral extending more than $\frac{1}{2}$ of the distance from its base to the base of ventral 25. *schomburgkii*.

B. Ventrals 6-rayed 26. *dissimilis*.

1. GALAXIAS ZEBRATUS.

Cobitis zebtratus Casteln. Poiss. Afrique Austr. p. 56 (1861).*Galaxias capensis* Steind. Sitzb. Ak. Wien, ciii. 1894, p. 460, pl. iii. fig. 2.

Teeth in the jaws subequal, without distinct enlarged canines. Depth of body $5-5\frac{1}{2}$ in the length, length of head $4-4\frac{1}{4}$. Snout a little shorter than eye, the diameter of which is about 4 in the length of head, interorbital width nearly 3. Jaws equal anteriorly; maxillary extending to below anterior $\frac{1}{4}$ of eye. 8 gill-rakers on the lower part of the anterior arch. Dorsal III 7-8; distance from origin of dorsal to base of caudal $2\frac{1}{2}-2\frac{2}{3}$ in the length of the fish. Anal III-IV 8, commencing below the middle or anterior part of the dorsal. Pectoral extending $\frac{1}{2}-\frac{3}{5}$ of the distance from its base to the base of ventral. Ventrals 6-rayed, originating at a point nearly equidistant from tip of snout and base of caudal, extending $\frac{1}{2}-\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal subtruncate. Caudal peduncle twice as long as deep. Irregular dark cross-bars on the back and sides of the body; head and body covered with small dark dots.

Cape of Good Hope.

1. (54 mm.)
2-6. (35-55 mm.)

—
Near Cape Town.

Sir. A. Smith.
Prof. M. Weber.

2. GALAXIAS PUNCTIFER. (Plate X. fig. 3.)

Cobitis punctifer Casteln. Poiss. Afrique Austr. p. 56 (1861).

Teeth in the jaws subequal, without distinct enlarged canines. Depth of body about $5\frac{1}{2}$ in the length, length of head $4\frac{1}{5}-4\frac{4}{5}$. Snout shorter than eye, the diameter of which is $3-3\frac{1}{2}$ in the length of head, interorbital width $2\frac{2}{3}-3\frac{1}{4}$. Jaws equal anteriorly; maxillary extending to below anterior margin of eye or slightly beyond. 8 or 9 gill-rakers on the lower part of the anterior arch. Dorsal III-IV 7-8; distance from origin of dorsal to base of caudal $2\frac{1}{2}-2\frac{2}{3}$ in the length of the fish. Anal III-IV 6-8, commencing below the middle or posterior part of the dorsal. Pectoral extending $\frac{1}{2}$ the distance from its base to the base of ventral. Ventrals 6-rayed, originating at a point nearer to tip of snout than to base of caudal, extending $\frac{1}{2}-\frac{3}{5}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $2\frac{1}{2}-3$ as long as deep. A series of obscure dark bars or blotches on the upper part of the sides; head and body covered with small dark dots.

Cape of Good Hope.

This species is distinguished from *G. zebtratus* by the shorter head, smaller mouth, more slender caudal peduncle, &c., but especially by the different shape of the caudal fin.

- 1-2. (47 and 54 mm.)
3-12. (27-30 mm.)

Near Cape Town.
Durban Rd., Cape Town.

S. African Mus.
C. D. Rudd, Esq.

3. *GALAXIAS ATTENUATUS*. (Plates XII. fig. 1, and XIII. fig. 2.)

Mesites attenuatus Jenyns, Zool. 'Beagle,' Fish. p. 121, pl. xxii. fig. 5 (1842).

Galaxias truttaceus (non Cuv.) Valenc. in Cuv. Règne Anim., Poiss. pl. xcvi. fig. 2 (1829).

Galaxias scriba Cuv. & Val. Hist. Nat. Poiss. xviii. p. 347 (1846); Richards. Zool. 'Erebus' & 'Terror,' Fish. p. 66 (1848); Günth. Cat. Fish. vi. p. 212 (1866).

Galaxias attenuatus Cuv. & Val. t. c. p. 348; Günth. t. c. p. 210; Hutton, Fish. N. Zeal. p. 60, pl. x. fig. 96 (1872); Klunz. Sitzb. Ak. Wien, lxxx. 1879, p. 412; Macleay, Proc. Linn. Soc. N. S. Wales, vi. 1881, p. 230; Johnston, Proc. Roy. Soc. Tasmania, 1882, p. 130; Hutton, Trans. New Zealand Inst. xxviii. 1896, p. 317; Ogilby, Proc. Linn. Soc. N. S. Wales, xxi. 1896, p. 71; Clarke, Trans. New Zealand Inst. xxxi. 1899, p. 78.

Galaxias maculatus (non Jenyns) Richards. t. c. p. 75, pl. xliii. figs. 14-17.

Galaxias minutus Philippi, Arch. f. Nat. 1858, vol. xxiv. i. p. 309.

Galaxias krefftii Günth. t. c. p. 211.

Galaxias punctatus Günth. t. c. p. 212.

Galaxias waterhousei Krefft, Proc. Zool. Soc. 1867, p. 943; Klunz. l. c.

Galaxias cylindricus Casteln. Proc. Roy. Soc. Victoria, i. 1872, p. 177; Macleay, t. c. p. 235.

Galaxias delicatulus Casteln. t. c. p. 178; Macleay, l. c.

Galaxias campbelli Sauv. Bull. Soc. Philom. (7) iv. 1880, p. 229.

Galaxias nebulosa Macleay, t. c. p. 234.

Galaxias alpinus (part.), Smitt, Bih. Svenska Ak. xxvi. iv. No. 13, p. 21, pl. ii. figs. 9-12 (1901).

Teeth in the jaws subequal, without distinct enlarged canines. Depth of body $5\frac{1}{2}$ -10 in the length, length of head $5-6\frac{1}{2}$. Snout a little longer than eye (in the adult), the diameter of which is 3 (young)-5 in the length of head, interorbital width $2\frac{1}{4}$ - $2\frac{2}{3}$. Jaws equal anteriorly; maxillary extending about to the vertical from anterior margin of eye or a little beyond. 6 or 7 branchiostegals. 9-11 gill-rakers on the lower part of the anterior arch. Dorsal 10-13 (III-IV 7-9); distance from origin of dorsal to base of caudal $3\frac{3}{4}$ (young)- $4\frac{1}{2}$ in the length of the fish. Anal 16-19 (III-V 12-15), commencing below the origin of dorsal. Pectoral extending from less than $\frac{1}{3}$ to more than $\frac{2}{5}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point about equidistant from tip of snout and base of caudal or from base or anterior part of pectoral and origin of anal, extending less than $\frac{1}{2}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $1\frac{1}{3}$ -2 as long as deep. Golden or orange; upper parts of head and body finely punctulated with blackish and spotted or marbled with dark purplish; fins immaculate.

South Australia, Victoria, New South Wales, Tasmania, New

Zealand and neighbouring islands, Falkland Is., Tierra del Fuego, Patagonia, and Chile.

With the type of the species, which I have been enabled to examine through the courtesy of Dr. S. F. Harmer, I have compared the types of *G. scriba*, for permission to examine which I am indebted to Prof. L. Vaillant, of *G. waterhousei*, kindly lent by the Director of the Australian Museum, and of *G. krefftii* and *G. punctatus*, preserved in the British Museum.

The varying size of the eye in preserved specimens is sometimes due to the method of preservation; often the eye tends to protrude and the circular fold surrounding it is stretched or broken, thus apparently increasing the size of the eye. In the type of *G. scriba*, which measures only 74 mm. in total length, the eye is slightly more than $\frac{1}{3}$ the length of head.

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|--------|--------------------|---------------------------------|--------------------|-----------------------|
| 1. | (130 mm.) | } types of <i>G. krefftii</i> . | { Murray R. | A. Lloyd, Esq. |
| 2-4. | (70-90 mm.) | | { Sydney. | G. Krefft, Esq. |
| 5. | (170 mm.) | | Eastern Creek. | G. Krefft, Esq. |
| | <i>punctatus</i> . | | | |
| 6-8. | (80-95 mm.) | | Australia. | G. Krefft, Esq. |
| 9. | (105 mm.) | | Mooraboul R. | Mr. E. Degen. |
| 10-19. | (75-135 mm.) | | Tasmania. | J. B. Jukes, Esq. |
| 20. | (90 mm.) | | Tasmania. | R. W. Johnston, Esq. |
| 21. | (170 mm.) | | Tasmania. | Sir. J. Richardson. |
| 22-23. | (78 and 110 mm.) | | ? New South Wales. | G. Krefft, Esq. |
| 24-26. | (65-135 mm.) | | New Zealand. | Otago Mus. |
| 27-33. | (90-120 mm.) | | New Zealand. | New Zealand Inst. |
| 34-35. | (85 and 110 mm.) | | Falkland Islands. | Sir J. Richardson. |
| 36. | (60 mm.) | | Tierra del Fuego. | Marquis G. Doria. |
| 37-44. | (55-60 mm.) | | Magellan. | Dr. Coppinger. |
| 45-50. | (63-80 mm.) | | ? Peru. | Royal Coll. Surgeons. |

The New Zealand race may usually be distinguished by the following characters:—Head moderate ($5\frac{1}{2}$ – $6\frac{1}{2}$ in the length in specimens of 65–135 mm.); eye rather large ($3\frac{1}{4}$ – $4\frac{1}{2}$ in the length of head); ventrals nearly always nearer to tip of snout than to base of caudal; dorsal and anal fins almost triangular in shape, the rays decreasing from the first branched ray, which is the largest, to the last, which is very short, the free edge of the fin being straight; caudal distinctly emarginate.

The Australian race often shows a slightly longer head (5–6 in the length in specimens of 70–170 mm.) and a slightly larger eye; the ventrals are sometimes equidistant from tip of snout and base of caudal, sometimes a little nearer to one or the other; the dorsal and anal fins are often more rounded than in the New Zealand form, the anterior branched rays being longer and decreasing in length less rapidly, the last ray also being longer; the caudal is usually not quite so distinctly emarginate.

The South American race seems perhaps to differ from the New Zealand one in having a slightly smaller head ($5\frac{1}{2}$ – $6\frac{1}{2}$ in the length in specimens of 55–110 mm.) and a smaller eye ($3\frac{1}{2}$ – $4\frac{2}{3}$ in the length of head).

Galaxias versicolor Casteln. (Proc. Zool. Soc. Victoria, i. 1872, p. 176) is probably allied to *G. attenuatus*, agreeing in the small head ($5\frac{8}{10}$ in the total length), small mouth (the maxillary just

reaching the vertical from the anterior margin of the eye), and in having the dorsal and anal opposite one another and the caudal emarginate. It appears to differ in the deeper body (depth $4\frac{2}{3}$ in the total length) and the fewer fin-rays (Dorsal 9, Anal 12). It is described from a specimen of 140 mm. from a marsh near St. Kilda, Victoria.

4. GALAXIAS GRACILLIMUS.

Mesites gracillimus Canestrini, Arch. Zool. Anat. Fisiol. iii. 1864, p. 100, pl. iv. fig. 2.

Galaxias gracillimus Günth. Cat. Fish. vi. p. 213 (1866).

Galaxias maculatus (non Jenyns) Smitt, Bih. Svenska Ak. xxvi. iv. No. 13, p. 21, pl. ii. figs. 5-8 (1901).

Teeth apparently as in *G. attenuatus*. Depth of body 10-12 in the length, length of head $7-7\frac{1}{2}$. Snout a little shorter than eye, the diameter of which is $3\frac{1}{4}-3\frac{1}{2}$ in the length of head and less than the interorbital width. Jaws equal anteriorly; maxillary extending nearly to the vertical from the anterior margin of eye. 5 or 6 branchiostegals. 9 or 10 gill-rakers on the lower part of the anterior arch. Dorsal 11-12 (III-IV 8-9); distance from origin of dorsal to base of caudal about $3\frac{3}{4}$ in the length of the fish. Anal 16-17 (III-IV 13-14), commencing below the origin of dorsal, when laid back not extending to the caudal. Pectoral extending about $\frac{2}{3}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point nearer to tip of snout than to base of caudal, and nearer to origin of anal than to base of pectoral, extending about $\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $2\frac{1}{2}$ as long as deep. Some small blackish spots on the head and on the upper part of the body; a line of black dots along the middle of the side and one at the base of each of the unpaired fins.

Chile; Falkland Is.

1-4. (53-55 mm.)

Falkland Is.

R. Vallentin, Esq.

Possibly this species may be based on a larval form of *G. attenuatus*, but if so it is remarkable that it has been recorded only from South America and that larval forms of other species have not been described.

5. GALAXIAS MACULATUS.

Mesites maculatus Jenyns, Zool. 'Beagle,' Fish. p. 119, pl. xxii. fig. 4 (1842).

Galaxias maculatus Cuv. & Val. Hist. Nat. Poiss. xviii. p. 355 (1846); Günth. Cat. Fish. vi. p. 212 (1866).

Galaxias punctulatus Philippi, Arch. f. Nat. 1858, vol. xxiv. i. p. 310.

Galaxias coppingeri Günth. Proc. Zool. Soc. 1881, p. 21.

Galaxias alpinus (non Jenyns) Smitt, Bih. Svenska Ak. xxiv. iv. No. 5, p. 56, pl. v. fig. 40 (1899).

Teeth in the jaws subequal, without distinct enlarged canines. Depth of body 6-8 in the length, length of head $4\frac{1}{2}-5\frac{3}{4}$. Snout

nearly as long as eye, the diameter of which is $3\frac{1}{2}$ – $4\frac{1}{3}$ in the length of head, interorbital width $2\frac{2}{5}$ –3. Jaws equal anteriorly; maxillary extending to below anterior margin of eye or slightly beyond. 6 or 7 branchiostegals. 9–12 gill-rakers on the lower part of the anterior arch. Dorsal III–IV 8; distance from origin of dorsal to base of caudal $3\frac{3}{4}$ – $4\frac{1}{4}$ in the length of the fish. Anal IV–V 11–14, commencing below the origin of dorsal, when laid back not reaching the caudal. Pectoral extending from less than $\frac{2}{5}$ to $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point a little nearer to base of caudal than to tip of snout or equidistant from middle of pectoral and origin of anal, extending from a little less than $\frac{2}{5}$ to nearly $\frac{3}{5}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $1\frac{1}{2}$ –2 as long as deep. Olivaceous, covered with numerous irregular blackish spots; fins immaculate.

Patagonia; Tierra del Fuego; Falkland Islands.

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| 1. (73 mm.) type of <i>G. coppingeri</i> . | Alert Bay. | Dr. Coppinger. |
| 2-3. (76 and 83 mm.) | Orange Bay. | Paris Mus. |
| 4-8. (82-93 mm.) | Falkland Is. | Commander Knoeker. |
| 9-11. (65-75 mm.) | Falkland Is. | R. Vallentin, Esq. |
| 12-21. (70-120 mm.) | Estero de Penco. | Mons. F. Lataste. |

6. GALAXIAS ALPINUS.

Mesites alpinus Jenyns, Zool. 'Beagle,' Fish. p. 121 (1842).

Galaxias alpinus Cuv. & Val. Hist. Nat. Poiss. xviii. p. 356 (1846); Günth. Cat. Fish. vi. p. 212 (1866).

Teeth in the jaws subequal, without distinct enlarged canines. Depth of body about 7 in the length, length of head $4\frac{1}{5}$ – $4\frac{2}{5}$. Snout shorter than eye, the diameter of which is 3 – $3\frac{1}{4}$ in the length of head and equal to the interorbital width. Lower jaw slightly projecting; maxillary extending to below anterior $\frac{1}{4}$ of eye. 6 branchiostegals. 12 gill-rakers on the lower part of the anterior arch. Dorsal III 8–9; distance from origin of dorsal to base of caudal $3\frac{2}{4}$ – $3\frac{7}{8}$ in the length of the fish. Anal IV 12–13, commencing below or slightly behind the origin of dorsal, when laid back not reaching the caudal. Pectoral extending $\frac{1}{2}$ or nearly $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from middle or posterior part of eye and base of caudal or from middle of pectoral and origin of anal, extending $\frac{3}{5}$ – $\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal apparently slightly emarginate. Caudal peduncle twice as long as deep. Head and body with small blackish dots, which are especially developed to form a mid-dorsal longitudinal band.

Alpine lakes of Hardy Peninsula, Tierra del Fuego.

1. (52 mm.) one of the types of the species.

Cambridge Univ. Mus.

Through the kindness of Dr. S. F. Harmer, F.R.S., I have been enabled to examine the types of the species, two specimens which measure 52 and 62 mm. respectively in total length, and to retain one of these for the British Museum Collection.

7. GALAXIAS PLATEI.

Galaxias platei Steind. Zool. Jahrb. Suppl. iv. 1897, p. 329, pl. xx. fig. 13.

Galaxias alpinus, (part.) Smitt, Bih. Svenska Ak. xxvi. iv. No. 13, p. 9, pl. iii. (1901).

Teeth in the jaws subequal, without distinct enlarged canines. Depth of body 5-6 in the length, length of head $4\frac{1}{4}$ - $4\frac{3}{4}$. Snout longer than eye, the diameter of which is $5\frac{1}{2}$ - $7\frac{1}{2}$ in the length of head, interorbital width $2\frac{1}{2}$ - $2\frac{2}{3}$. Jaws equal anteriorly; maxillary extending to below the middle of eye. 8 or 9 branchiostegals. 11-13 gill-rakers on the lower part of the anterior arch. Dorsal IV 8; distance from origin of dorsal to base of caudal $3\frac{1}{2}$ - $3\frac{3}{4}$ in the length of the fish. Anal IV-V 10-11, commencing below the anterior part or middle of the dorsal, when laid back extending to the procurent rays or base of caudal. Pectoral extending $\frac{2}{5}$ - $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from cheek or preoperculum and base of caudal or from middle or extremity of pectoral and origin of anal, extending $\frac{3}{5}$ - $\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal truncate. Caudal peduncle as long or a little longer than deep. Head, body, and fins covered with numerous irregular dark spots.

Patagonia.

1. (195 mm.)
- 2-5. (260 and 300 mm.)

Rio Chico.
Magellan.

Marquis G. Doria.
Mons. F. Lataste.

The two large fishes, undoubtedly belonging to one species, from a lake in the province of Punta Arenas, Chile, described by Philippi (Verh. Deust. Wiss. Ver. Sant. Chile, iii. 1895, p. 19) under the names of *Galaxias grandis* and *G. delfini*, agree with *G. platei* in the form and proportions of head and body, size of the eye, shape of the caudal, length of pectoral and ventral and size of the dorsal fin, and also in coloration. The unpaired fins are torn in the type of *G. grandis*, a fish of 330 mm., and the number of fin-rays in *G. delfini* is given as Dorsal 8, Anal 18. If it were not for this, I should have no hesitation in regarding this species and *G. platei* as the same.

8. GALAXIAS SMITHII, sp. n.

Lower jaw with distinct lateral canines. Depth of body $6\frac{1}{2}$ in the length, length of head $5\frac{1}{3}$. Snout slightly longer than eye, the diameter of which is $4\frac{1}{4}$ in the length of head, interorbital width $2\frac{2}{3}$. Jaws equal anteriorly; maxillary extending nearly to below middle of eye. 8 branchiostegals. 10 gill-rakers on the lower part of the anterior arch. Dorsal III-IV 9; distance from origin of dorsal to base of caudal $3\frac{2}{5}$ in the length of the fish. Anal IV 10, commencing below the anterior part of the dorsal, when laid back not extending to the caudal. Pectoral extending more than $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point slightly

nearer to tip of snout than to base of caudal or equidistant from base of pectoral and origin of anal, extending nearly $\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal truncate. Caudal peduncle $1\frac{2}{3}$ as long as deep. Greyish, with traces of darker vertical stripes; a dark bar above the pectoral.

Falkland Islands.

1. (110 mm.) type of the species.

Falkland Is.

Sir A. Smith.

9. *GALAXIAS HUTTONI*, sp. n. (Plate X. fig. 2.)

Teeth apparently as in *G. attenuatus*. Depth of body about 7 in the length, length of head nearly 5. Snout a little shorter than eye, the diameter of which is $3-3\frac{1}{2}$ in the length of head, interorbital width about $2\frac{1}{2}$. Jaws equal anteriorly; maxillary extending to below anterior $\frac{1}{4}$ or anterior $\frac{1}{3}$ of eye. 7 branchiostegals. 9 gill-rakers on the lower part of anterior arch. Dorsal III-IV 7-8; distance from origin of dorsal to base of caudal $3\frac{1}{2}-3\frac{3}{4}$ in the length of the fish. Anal IV-V 10-12, commencing below the origin or anterior part of dorsal, when laid back not extending to the caudal. Pectoral extending from more than $\frac{1}{2}$ to $\frac{2}{3}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from tip of snout and base of caudal, or nearer the former, or equidistant from base of pectoral and origin of anal, extending from more than $\frac{1}{2}$ to $\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal emarginate. Caudal peduncle $1\frac{2}{3}-2$ as long as deep. Yellowish with brown cross-bars; fins pale.

Lake Rainiera, New Zealand.

1-7. (39-45 mm.) types of the species.

Lake Rainiera.

Prof. F. W. Hutton.

Perhaps as closely allied to *G. lynx* as to *G. attenuatus*.

10. *GALAXIAS LYNX*. (Plate X. fig. 4.)

Galaxias olidus (non Günth.) Hutton, Trans. N. Zealand Inst. v. 1872, p. 270, and Fishes of N. Zeal. Suppl. p. 11 (1873).

Galaxias lynx Hutton, Trans. N. Zealand Inst. xxviii. 1896, p. 317.

Lower jaw with distinct lateral canines. Depth of body 6-7 in the length, length of head $4\frac{1}{3}-4\frac{2}{3}$. Snout nearly as long as or longer than eye, the diameter of which is $3\frac{1}{2}-5$ in the length of head, interorbital width $2\frac{3}{4}-3$. Jaws equal anteriorly or the lower slightly projecting; maxillary extending to below middle of eye, in the adult. 8 or 9 branchiostegals. 12-14 gill-rakers on the lower part of the anterior arch. Dorsal IV 8; distance from origin of dorsal to base of caudal $3\frac{1}{2}-3\frac{2}{3}$ in the length of the fish. Anal V 10-11, commencing below the anterior part of the dorsal, when laid back not nearly extending to the caudal. Pectoral extending $\frac{1}{2}$ or nearly $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point about equidistant from eye and base of caudal or from middle or posterior part of pectoral and origin of anal, extending $\frac{2}{5}-\frac{2}{3}$ of the distance from their base to

the origin of anal. Caudal truncate or slightly emarginate. Caudal peduncle nearly twice as long as deep. Traces of irregular dark cross-bars in the young.

Lakes Coleridge and Wakatipu, New Zealand.

| | | |
|------------------|-----------------|-----------------|
| 1-3. (58-83 mm.) | Lake Coleridge. | Canterbury Mus. |
| 4. (170 mm.) | Lake Wakatipu. | Otago Mus. |

11. GALAXIAS BREVIPINNIS*.

Galaxias brevipinnis Günth. Cat. Fish. vi. p. 213 (1866); Hutton, Fish. N. Zeal. p. 59 (1872), and Trans. N. Zealand Inst. xxviii. 1896, p. 317.

Galaxias grandis Haast, Trans. N. Zealand Inst. v. 1872, p. 278.

Galaxias robinsoni Clarke, Trans. N. Zealand. Inst. xxxi. 1899, p. 89, pl. v.

Galaxias bollansi Hutton, Trans. N. Zealand Inst. xxxiv. 1902, p. 198.

Lower jaw with distinct lateral canines. Depth of body $4\frac{2}{3}$ - $6\frac{2}{3}$ in the length, length of head $4\frac{2}{3}$ - $5\frac{1}{4}$. Snout as long as or longer than eye, the diameter of which is 4-6 in the length of head, interorbital width 2- $2\frac{1}{3}$. Jaws equal anteriorly or the lower a little shorter than the upper; maxillary extending to below middle of eye or a little beyond. 7 branchiostegals. 7-9 gill-rakers on the lower part of the anterior arch. Dorsal IV 8-9; distance from origin of dorsal to base of caudal $3\frac{2}{3}$ -4 in the length of the fish. Anal IV-V 9-10, commencing below the middle of the dorsal, when laid back extending to the procurent caudal rays. Pectoral extending from $\frac{2}{5}$ to more than $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point about equidistant from angle of mouth and base of caudal or from middle of pectoral and origin of anal, extending $\frac{1}{2}$ - $\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal truncate or slightly emarginate. Caudal peduncle $1\frac{1}{5}$ - $1\frac{2}{5}$ as long as deep. Head, body, and fins with dark brown spots, marblings, or reticulations.

New Zealand and neighbouring islands.

| | | |
|--|--------------------|---------------------|
| 1-3. (133-153 mm.) types of the species. | New Zealand. | Capt. Stokes. |
| 4. Skeleton. | New Zealand. | Dr. Günther. |
| 5. (210 mm.) | North Island, N.Z. | H. K. Nicholl, Esq. |
| 6. (158 mm.) | Dunedin, N.Z. | Otago Mus. |
| 7-11. (73-115 mm.) | | Wellington Mus. |
| 12. (105 mm.) type of <i>G. bollansi</i> . | Auckland Is. | Prof. F. W. Hutton. |

12. GALAXIAS FASCIATUS.

Galaxias fasciatus Gray, Zool. Misc. p. 73 (1831), and in Dieffenb. New Zealand, ii. p. 221 (1842); Cuv. & Val. Hist. Nat. Poiss. xviii. p. 350 (1847); Richards. Zool. 'Erebus' & 'Terror,' Fish. p. 77 (1848); Günth. Cat. Fish. vi. p. 209 (1866); Hutton, Fish. N. Zeal. p. 59, pl. x. fig. 94 (1872), and Trans. N. Zealand Inst. xxviii. 1896, p. 317; Clarke, ib. xxxi. 1899, p. 90, pl. v.

* An excellent figure of this species is given in the 'Cambridge Natural History,' vol. vii. p. 607.

Galaxias brocchus Richards, t. c. p. 76, pl. xliii. figs. 8-13.

Galaxias reticulatus Richards, l. c. pl. xlii. figs. 7-12.

Galaxias postvectis Clarke, t. c. p. 88, pl. v.

Lower jaw with distinct lateral canines. Depth of body 4-5½ in the length, length of head 4-5. Snout as long as or a little longer than eye, the diameter of which is 4-5 in the length of head, interorbital width 1¾-2½. Jaws equal anteriorly; maxillary extending to below posterior part of eye. 8 or 9 branchiostegals. 10 or 11 gill-rakers on the lower part of the anterior arch. Dorsal IV 7-9; distance from origin of dorsal to base of caudal 3½-4½ in the length of the fish. Anal IV-V 10-11, commencing below or a little behind the origin of dorsal, when laid back extending to or a little beyond the base of the caudal. Pectoral extending from more than ½ to nearly ¾ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from snout or eye and base of caudal or from anterior part or middle of pectoral and origin of anal, extending ¾-¾ of the distance from their base to the origin of anal. Caudal truncate. Caudal peduncle from ¾ to as long as deep. Brownish, with narrow light vertical stripes, which may be undulating or irregular or may form reticulations; often a light vertical bar above the base of pectoral, succeeded by a dark purplish blotch.

New Zealand and neighbouring islands.

| | | |
|---|-------------------|---------------------|
| 1-3. (82-210 mm.) types of the species. | New Zealand. | Dr. Dieffenbach. |
| 4. (145 mm.) | New Zealand. | Dr. Sinclair. |
| 5. (215 mm.) type of <i>G. brocchus</i> . | Auckland Islands. | Sir J. Richardson. |
| 6-8. (140-170 mm.) types of <i>G. reticulatus</i> . | Auckland Islands. | Sir J. Richardson. |
| 9-10. (150-185 mm.) | New Zealand. | Capt. Stokes. |
| 11. (115 mm.) | Porirua. | Wellington Mus. |
| 12. (205 mm.) | Chatham Islands. | Prof. F. W. Hutton. |

A large female specimen, ready to spawn, measuring 265 mm. in total length, has not been included in the above diagnosis. The depth of the body is ¾ of its length, the caudal peduncle is ¾ as long as deep, the maxillary does not extend beyond the middle of the eye, the origin of the anal fin is only a little in advance of the middle of the dorsal. These peculiarities appear due partly to the condition of the fish, partly to individual variation.

13. GALAXIAS ALEPIDOTUS.

Esox alepidotus Forster, Descript. Anim. p. 142 (1844); Schneider in Bloch's System. Ichthyol. p. 395 (1801).

Galaxias alepidotus Cuv. Règne Anim. ii. p. 283 (1829); Richards, in Dieffenb. New Zealand, Appendix, p. 219 (1842), and Zool. 'Erebus' & 'Terror,' Fish. p. 77 (1848); Günth. Cat. Fish. vi. p. 208 (1866); Hutton, Fish. N. Zeal. p. 58 (1872), and Trans. N. Zealand Inst. xxviii. 1896, p. 317.

Galaxias forsteri Cuv. & Val. xviii. p. 351 (1847).

Galaxias kokopu Clarke, Trans. N. Zealand Inst. xxxi. 1899, p. 88, pl. iv.

Lower jaw with distinct lateral canines. Depth of body $4-4\frac{1}{2}$ in the length, length of head $3\frac{3}{5}-3\frac{4}{5}$. Snout a little longer than eye, the diameter of which is 5 in the length of head, interorbital width $2\frac{1}{4}-2\frac{1}{3}$. Jaws equal anteriorly; maxillary usually extending beyond middle of eye. 8 or 9 branchiostegals. 10 or 11 gill-rakers on the lower part of the anterior arch. Dorsal IV 9-10; distance from origin of dorsal to base of caudal $4-4\frac{1}{2}$ in the length of the fish. Anal IV-V 10-11, commencing below or a little behind the origin of dorsal, when laid back extending beyond the base of caudal. Pectoral extending $\frac{3}{5}-\frac{2}{3}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from cheek or posterior margin of eye and base of caudal or from middle of pectoral and origin of anal, extending $\frac{2}{3}-\frac{4}{5}$ of the distance from their base to the origin of anal. Caudal truncate. Caudal peduncle nearly $\frac{3}{4}$ as long as deep. Brownish, with rather large rounded, oblong or crescentic, light yellowish spots; fins dusky.

New Zealand.

1-3. (163-205 mm.)

New Zealand.
Thomson Sound, Otago.

Capt. Stokes.
Otago Mus.

14. GALAXIAS OCCIDENTALIS. (Plate XI. fig. 4.)

Galaxias occidentalis Ogilby, Proc. Linn. Soc. N. S. Wales, xxiv. 1899, p. 157.

Teeth in the jaws subequal, without distinct lateral canines. Depth of body $5\frac{2}{3}$ in the length, length of head $5\frac{1}{3}$. Snout a little longer than eye, the diameter of which is $4\frac{1}{2}$ in the length of head, interorbital width $2\frac{2}{5}$. Lower jaw projecting; maxillary extending to below anterior $\frac{1}{3}$ of eye. 6 or 7 branchiostegals. 10 gill-rakers on the lower part of the anterior arch. Dorsal 10 (III 7); distance from origin of dorsal to base of caudal $4\frac{1}{5}$ in the length of the fish. Anal 15 (V 10), commencing below the origin of dorsal, when laid back not nearly extending to the precurrent caudal rays. Pectoral extending a little more than $\frac{1}{3}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from tip of snout and base of caudal or a little nearer to origin of anal than to base of pectoral, extending a little more than $\frac{1}{3}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $1\frac{1}{2}$ as long as deep. Yellowish, with narrow dark cross-bars on the sides of the body; a pair of dark blotches on the basal part of the caudal.

Western Australia.

1. (155 mm.) one of the types.

W. Australia.

Australian Mus.

15. GALAXIAS WAITII, sp. n. (Plate XI. fig. 2.)

Teeth in the jaws subequal, without distinct lateral canines. Depth of body $6\frac{1}{2}-6\frac{3}{4}$ in the length, length of head $4\frac{2}{3}-4\frac{3}{4}$. Snout

longer than eye, the diameter of which is $5-5\frac{1}{3}$ in the length of head, interorbital width $2\frac{1}{2}-2\frac{3}{4}$. Lower jaw slightly or distinctly projecting; maxillary extending to below anterior $\frac{1}{4}$ of eye. 6 or 7 branchiostegals. 11 or 12 gill-rakers on the lower part of the anterior arch. Dorsal 11-13 (IV-V 7-8); distance from origin of dorsal to base of caudal $3\frac{4}{5}-4\frac{1}{5}$ in the length of the fish. Anal 13-14 (IV 9-10), commencing below or somewhat in advance of the middle of dorsal, when laid back extending nearly to the procurent caudal rays. Pectoral extending a little more than $\frac{2}{5}$ of the distance from its base to the base of the ventral. Ventrals 7-rayed, originating at a point equidistant from tip of snout and base of caudal or from base of pectoral and origin of anal, extending $\frac{1}{3}-\frac{2}{5}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $1\frac{1}{2}-1\frac{2}{3}$ as long as deep. Brownish (in spirit); caudal fin with a more or less distinct pair of dark stripes running from the base to the posterior angles of the fin.

Gulpa Creek, New South Wales.

1-4. (110-125 mm.) types of the species.

Australian Museum.

16. GALAXIAS WEEDONI. (Plate XI. fig. 1.)

Galaxias weedoni Johnston, Proc. Roy. Soc. Tasmania, 1881, p. 131 (1882).

Galaxias atkinsonii Johnston, l. c.

Lower jaw with the lateral teeth slightly or distinctly enlarged and canine-like. Depth of body $5-6\frac{1}{2}$ in the length, length of head 5. Snout slightly longer than eye, the diameter of which is $4\frac{1}{2}-4\frac{3}{4}$ in the length of head, interorbital width $2\frac{1}{3}-2\frac{2}{3}$. Lower jaw slightly shorter than the upper; maxillary extending to below the middle of eye. 9 branchiostegals; 9 gill-rakers on the lower part of the anterior arch. Dorsal 11-12 (IV 7-8); distance from origin of dorsal to base of caudal $3\frac{3}{5}-3\frac{3}{4}$ in the length of the fish. Anal 14 (IV-V 9-10), commencing below or in advance of the middle of dorsal, when laid back nearly reaching the procurent caudal rays. Pectoral extending $\frac{1}{2}-\frac{2}{3}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from tip of snout and base of caudal or from base of pectoral and origin of anal, extending $\frac{1}{2}-\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $1\frac{1}{3}$ as long as deep. Brownish, with dark brown spots and vertical bars; a dark bar above the base of pectoral; fins with a few dark spots.

Tasmania.

1. (110 mm.)

Tasmania.

R. W. Johnston, Esq.

2-3. (100 and 105 mm.)

Australian Mus.

The first specimen was received from Mr. Johnston in 1880, and it appears to correspond to his *Galaxias weedoni* from the River Mersey.

Five small specimens (50-68 mm.) from Lake Laura, received

from Prof. W. B.³ Spencer, agree very well with Johnston's description of *Galaxias atkinsonii* from the River Pieman. They differ from the adult fish in the more slender body (depth 6-8 in the length, caudal peduncle $1\frac{2}{5}$ - $1\frac{3}{4}$ as long as deep), the smaller mouth with the jaws equal anteriorly, and the less distinct markings.

17. GALAXIAS ROSTRATUS.

Galaxias rostratus Klunz. Arch. f. Nat. 1872, p. 41.

Depth of body $8\frac{1}{2}$ in the total length, length of head $5\frac{1}{2}$. Snout $1\frac{1}{2}$ as long as eye, the diameter of which is $4\frac{1}{2}$ in the length of head and $1\frac{1}{2}$ in the interorbital width. Jaws equal anteriorly; maxillary extending to below middle of eye. 6 branchiostegals. Dorsal 11. Anal 14, commencing a little behind the origin of the dorsal. Pectoral extending much less than $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from anterior margin of eye and base of caudal. A dark spot on the base of the caudal fin.

Mersey River.

Total length 130 mm.

Evidently allied to *G. occidentalis* and *G. waitii*

18. GALAXIAS TRUTTACEUS. (Plate XIII. fig. 4.)

Galaxias truttaceus Cuv. Règne Anim. ii. p. 283 (1817); Cuv. & Val. Hist. Nat. Poiss. xviii. p. 344, pl. 543 (1846); Richards. Zool. 'Erebus' & 'Terror,' Fish. p. 75, pl. xlii. figs. 1-6; Günth. Cat. Fish. vi. p. 209 (1866); Macleay, Proc. Linn. Soc. N.S. Wales, vi. 1881, p. 229; Johnston, Proc. Roy. Soc. Tasmania, 1882, p. 130.

Galaxias ocellatus McCoy, Intern. Exhib. Ess. p. 14 (1866); Casteln. Proc. Zool. Soc. Victoria, i. 1872, p. 175; Macleay, t. c. p. 235.

Lower jaw with the lateral teeth more or less distinctly enlarged and canine-like. Depth of body 5-6 in the length, length of head $4\frac{2}{3}$ - $4\frac{4}{5}$. Snout as long as or slightly longer than eye, the diameter of which is 4 - $4\frac{2}{3}$ in the length of head, interorbital width $2\frac{1}{4}$. Jaws equal anteriorly; maxillary extending to below anterior $\frac{1}{4}$ or anterior $\frac{1}{3}$ of eye. 7-9 branchiostegals. 8 or 9 gill-rakers on the lower part of the anterior arch. Dorsal 10-12 (III-IV 7-8); distance from origin of dorsal to base of caudal $3\frac{2}{3}$ - $3\frac{3}{4}$ in the length of the fish. Anal 14-16 (IV-V 10-12), commencing below the anterior $\frac{1}{4}$ of the dorsal, when laid back usually reaching the procurent caudal rays. Pectoral extending $\frac{1}{2}$ the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from eye and base of caudal, extending $\frac{2}{3}$ of the distance from their base to the origin of anal. Caudal emarginate. Caudal peduncle a little longer than deep. Olivaceous, with purplish ocellated spots; upper lip dark; an oblique dark stripe running back from below the eye;

sometimes 2 or 3 dark vertical bars above the base of the pectoral ; dorsal, anal, and ventral fins sometimes blackish at the tip.

Tasmania ; Victoria.

A. *Forma typica*, with 2 or 3 dark vertical bars above the pectoral and with the dorsal, anal, and ventral fins blackish at the tip.

| | | |
|---------------------|-----------|----------------------|
| 1. (105 mm.) | Tasmania. | Sir J. Richardson. |
| 2-6. (90-130 mm.) | Tasmania. | Haslar Coll. |
| 7-8. (110-160 mm.) | Tasmania. | J. Gould, Esq. |
| 9-11. (107-118 mm.) | Tasmania. | R. W. Johnston, Esq. |

B. Variety without bars above the pectoral, with fins uniformly pale.

| | | |
|------------------------|-------------------------|---------------|
| 1-2. (112 and 128 mm.) | Moorabool R., Victoria. | Mr. E. Degen. |
|------------------------|-------------------------|---------------|

According to Johnston (*l. c.*) there are Tasmanian varieties of this species without bars above the pectoral.

19. GALAXIAS AURATUS. (Plate XIII. fig. 1.)

Galaxias auratus Johnston, Proc. Roy. Soc. Tasmania, 1881, p. 131 (1882).

Lower jaw with the lateral teeth somewhat enlarged. Depth of body about 5 in the length, length of head about 4. Snout scarcely longer than eye, the diameter of which is $4\frac{1}{3}$ in the length of head, interorbital width $2\frac{3}{5}$. Jaws equal anteriorly ; maxillary extending to below anterior $\frac{1}{4}$ of eye. 7-9 branchiostegals. 10 gill-rakers on the lower part of the anterior arch. Dorsal IV 8 ; distance from origin of dorsal to base of caudal $3\frac{2}{3}$ in the length of the fish. Anal IV 10, commencing below the middle of the dorsal, when laid back extending to the procurent caudal rays. Pectoral extending $\frac{1}{2}$ the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from posterior margin of preoperculum and base of caudal, extending nearly to the vent. Caudal emarginate. Caudal peduncle as long as deep. Reddish above, golden on the sides and beneath ; upper part of head and body with numerous rather large purplish spots ; fins pale, the dorsal, anal, and ventrals with the free edge blackish.

Neighbourhood of the Great Lake, Tasmania.

The description above is based on a single specimen measuring 125 mm. in total length, received from Mr. R. W. Johnston in 1880. The species is said by him to be confined to the neighbourhood of the Great Lake, at an altitude of about 4000 feet, and to attain a larger size than any other member of the genus. He gives the following measurements of a large specimen :—Total length $9\frac{2}{3}$ inches ; length, without caudal, $8\frac{1}{2}$ inches ; length of head [*i. e.* including opercular flap] $2\frac{1}{2}$ inches ; depth of body nearly 2 inches ; length of snout $\frac{3}{4}$ inch ; interorbital width 1 inch.

The species is especially distinguished from the allied *G. truttaceus* by the larger head and the more posterior position of the ventrals.

20. *GALAXIAS COXII*. (Plate XII. fig. 2.)

Galaxias coxii Macleay, Proc. Linn. Soc. N. S. Wales, v. 1880, p. 45.

Galaxias nigothoruk Lucas, Proc. Roy. Soc. Victoria, (2) iv. 1892, p. 28.

Lower jaw with distinct lateral canines. Depth of body 5-6 in the length, length of head $4\frac{1}{2}$ -5. Snout as long as or a little longer than eye, the diameter of which is 4-5 in the length of head, interorbital width $2-2\frac{1}{3}$. Jaws equal anteriorly; maxillary extending nearly to below middle of eye. 7 or 8 branchiostegals. 8-9 gill-rakers on the lower part of the anterior arch. Dorsal IV 7-9; distance from origin of dorsal to base of caudal $3\frac{3}{4}$ -4 in the length of the fish. Anal IV-V 8-10, commencing below or in advance of the middle of dorsal, when laid back extending to the base of caudal. Pectoral extending about $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from eye and base of caudal or from middle of pectoral and origin of anal, extending more than $\frac{1}{2}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle as long as or a little longer than deep. Brownish, with numerous small dark spots or vertical streaks; a more or less distinct dark vertical bar above the base of pectoral; fins usually dusky.

Victoria; New South Wales.

- | | | |
|--|-----------------------|-----------------|
| 1. (95 mm.) one of the type of <i>G. nigothoruk</i> . | Nigothoruk, Victoria. | Prof. A. Dendy. |
| 2-6. (145-180 mm.) | | Australian Mus. |

The specimens received from the Australian Museum, without name and without locality, evidently correspond to Macleay's *Galaxias coxii*, from Mt. Wilson, New South Wales, and may probably be regarded as the types of that species.

21. *GALAXIAS AFFINIS*, sp. n. (Plate X. fig. 1.)

Lower jaw with distinct lateral canines. Depth of body 6-7 in the length, length of head $4\frac{1}{2}$ - $4\frac{3}{4}$. Snout longer than eye, the diameter of which is $4\frac{2}{3}$ - $5\frac{1}{2}$ in the length of head, interorbital width $2\frac{1}{3}$ - $2\frac{2}{3}$. Jaws equal anteriorly; maxillary extending to below middle of eye. 8 or 9 branchiostegals. 8 or 9 gill-rakers in the lower part of the anterior arch. Dorsal IV 6-8; distance from origin of dorsal to base of caudal $3\frac{3}{5}$ - $3\frac{4}{5}$ in the length of the fish. Anal IV-V 8-9, commencing below the middle of dorsal, when laid back not reaching the caudal. Pectoral extending nearly $\frac{1}{2}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point about equidistant from eye and base of caudal or from anterior part of pectoral and origin of anal, extending $\frac{1}{2}$ or nearly $\frac{1}{2}$ of the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $1\frac{1}{3}$ - $1\frac{1}{2}$ as long as deep. Brownish, with numerous small dark spots; a dark vertical bar above the base of pectoral; fins dusky.

Tasmania.

This species is very closely allied to *G. coxii*, but is distinguished by the smaller eye, the somewhat shorter ventrals, less deep anal, and more slender caudal peduncle.

| | | |
|--|-----------------|----------------------|
| 1-4. (120-150 mm.) types of the species, | Lake St. Clair. | Prof. W. B. Spencer. |
| 5-6. (73 and 78 mm.) | Tasmania. | Australian Mus. |

22. *GALAXIAS ORNATUS*.

Galaxias ornatus Casteln. Proc. Zool. Soc. Victoria, ii. 1873, p. 153; Macleay, Proc. Linn. Soc. N. S. Wales, vi. 1881, p. 237.

Depth of body about 6 in the length, length of head $5\frac{3}{5}$. Snout a little longer than eye, the diameter of which is 5 in the length of head, interorbital width $2\frac{1}{4}$. Lower jaw slightly projecting; maxillary extending to below anterior $\frac{1}{3}$ of eye. 8 gill-rakers on the lower part of the anterior arch. Dorsal III 8; distance from origin of dorsal to base of caudal $3\frac{1}{3}$ in the length of the fish. Anal III 9, commencing slightly in advance of the posterior end of the base of dorsal, when laid back not extending to the caudal. Pectoral extending $\frac{2}{5}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point nearly equidistant from tip of snout and base of caudal, extending $\frac{2}{5}$ of the distance from their base to the origin of anal. Caudal emarginate. Caudal peduncle $1\frac{2}{3}$ as long as deep. Body with numerous irregular dark vertical stripes; fins immaculate.

Victoria.

The typical example, from Cardinia Creek, measures 105 mm. in total length; I have been permitted to examine it by the courtesy of Prof. L. Vaillant.

23. *GALAXIAS OLIDUS*. (Plate XI. fig. 3.)

Galaxias olidus Günth. Cat. Fish. vi. p. 209 (1866).

Galaxias kayi Ramsay & Ogilby, Proc. Linn. Soc. N. S. Wales, (2) i. 1886, p. 6.

Teeth in the jaws subequal, without distinct lateral canines. Depth of body $4-6\frac{1}{2}$ in the length, length of head $5-5\frac{2}{5}$. Snout as long as or slightly longer than eye, the diameter of which is $4-4\frac{3}{4}$ in the length of head, interorbital width $2\frac{1}{5}-2\frac{2}{5}$. Jaws equal anteriorly; maxillary extending to below middle of eye. 7 or 8 branchiostegals. 7 or 8 gill-rakers on the lower part of the anterior arch. Dorsal 10-12 (III-IV 7-9); distance from origin of dorsal to base of caudal $3\frac{1}{3}-3\frac{2}{3}$ in the length of the fish. Anal 11-13 (IV 7-9), commencing behind the middle of the dorsal, when laid back nearly reaching the procurrent caudal rays. Pectoral extending from $\frac{1}{3}$ to a little more than $\frac{2}{5}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from eye and base of caudal or from middle or posterior part of pectoral and origin of anal, extending $\frac{2}{5}-\frac{1}{2}$ of the distance from their base to the origin of anal. Caudal slightly

emarginate. Caudal peduncle $1\frac{1}{3}$ – $1\frac{1}{2}$ as long as deep. Dark spots or undulating vertical stripes on the sides of the body.

South Australia.

| | | | |
|------|--|---------------|-----------------|
| 1-2. | (100 and 110 mm.) types of the species. | | G. Krefft, Esq. |
| 3. | (112 mm.) one of the types of <i>G. kayi</i> . | Fifth Creek. | Australian Mus. |
| 4-5. | (75 and 84 mm.) | Adelaide. | " |
| 6. | (74 mm.) | S. Australia. | " |

24. GALAXIAS FINDLAYI. (Plate XIII. fig. 3.)

Galaxias findlayi Macleay, Proc. Linn. Soc. N. S. Wales, vii. 1882, p. 107; Ogilby, Proc. Linn. Soc. N. S. Wales, xxi. 1896, p. 66.

Teeth in the jaws subequal, without distinct lateral canines. Depth of body $5\frac{1}{2}$ – $7\frac{1}{2}$ in the length, length of head $4\frac{2}{3}$ – $5\frac{2}{3}$. Snout as long as or longer than eye, the diameter of which is 4–5 in the length of head, interorbital width $2\frac{1}{4}$ – $2\frac{1}{2}$. Jaws equal anteriorly or the lower somewhat the shorter; maxillary extending to below anterior $\frac{1}{3}$ of eye or beyond. 8 to 10 branchiostegals. 7 to 9 gill-rakers on the lower part of the anterior arch. Dorsal 11–13 (III–IV 7–9); distance from origin of dorsal to base of caudal $3\frac{1}{4}$ – $3\frac{3}{4}$ in the length of the fish. Anal 13–14 (III–V 8–10), commencing below the posterior $\frac{1}{2}$ of the dorsal, when laid back not extending to the caudal. Pectoral extending $\frac{2}{5}$ of the distance from its base to the base of ventral. Ventrals 7-rayed, originating at a point equidistant from eye or cheek and base of caudal or from posterior part of pectoral and origin of anal, extending $\frac{1}{2}$ the distance from their base to the origin of anal. Caudal slightly emarginate. Caudal peduncle $1\frac{1}{2}$ –2 as long as deep. Sides of body with dark spots, blotches, or vertical bars.

Victoria; New South Wales.

| | | | |
|--------|-----------------|------------------|-------------------------|
| 1-2. | (75 and 78 mm.) | Mt. Kosciusko. | J. Douglas Ogilby, Esq. |
| 3-7. | (40–80 mm.) | Australian Alps. | Australian Mus. |
| 8-9. | (81 and 83 mm.) | Richmond R. | " |
| 10-11. | (42 and 57 mm.) | Colo Vale. | " |
| 12-13. | (66 and 68 mm.) | — | " |

Galaxias planiceps and *G. bong-bong* Macleay, Proc. Linn. Soc. N. S. Wales, vi. 1881, p. 233, respectively from Bathurst and from Moss Vale and Bong-Bong, are probably not distinct from this species.

25. GALAXIAS SCHOMBURGHII.

Galaxias schomburgkii Peters, Monatsb. Ak. Berlin, 1868, p. 455.

Depth of body $6\frac{1}{2}$ in the total length, length of head $5\frac{1}{2}$. Eye occupying the second fourth of the length of the head. Dorsal 9. Anal 10, commencing scarcely before the posterior end of the dorsal. Pectoral extending more than $\frac{1}{2}$ of the distance from its base to the base of ventral.

Adelaide.

Total length 50 mm.

Probably allied to *G. olidus*.

26. *GALAXIAS DISSIMILIS*, sp. n.

Teeth in the jaws subequal, without distinct lateral canines. Depth of body 6 in the length, length of head $3\frac{1}{2}$. Snout much longer than eye, the diameter of which is 5 in the length of head, interorbital width $3\frac{1}{2}$. Jaws equal anteriorly; maxillary extending to below anterior $\frac{1}{4}$ of eye. 8 or 9 branchiostegals. 13 gill-rakers on the lower part of the anterior arch. Dorsal 13; distance from origin of dorsal to base of caudal $2\frac{1}{3}$ in the length of the fish; length of base of dorsal equal to its distance from the caudal. Anal 9, commencing below the last 2 or 3 rays of dorsal, when laid back not reaching the caudal. Pectoral extending $\frac{2}{3}$ of the distance from its base to the base of ventral. Ventrals 6-rayed, commencing below the origin of dorsal, extending nearly to the origin of anal. Caudal slightly emarginate. Caudal peduncle $1\frac{2}{5}$ as long as deep. Uniform brownish (in spirit).

? New South Wales.

1. (75 mm.) type of the species.

Australian Mus.

NEOCHANNA.

Neochanna Günth. Ann. Mag. Nat. Hist. (3) xx. 1867, p. 305.

Differs from *Galaxias* in having no ventral fins, the teeth in the jaws obtuse and somewhat compressed, and the palate toothless. 54 vertebrae.

A single species from New Zealand.

NEOCHANNA APODA.

Neochanna apoda Günth. t. c. p. 306, pl. vii.; Hutton, Fish. N. Zeal. p. 61, pl. x. fig. 97 (1872).

Depth of body 7-8 in the length, length of head $5-5\frac{3}{5}$. Diameter of eye 6-8 in the length of head, interorbital width $2\frac{1}{2}-2\frac{4}{5}$. Jaws equal anteriorly; maxillary extending to below the eye. 7 branchiostegals. 8 gill-rakers on the lower part of the anterior arch. Dorsal 16-19; distance from origin of dorsal to base of caudal $3\frac{3}{5}-3\frac{4}{5}$ in the length of the fish. Anal 16-19, opposite to the dorsal and similar to it, both fins subcontinuous with the caudal. Pectoral about $\frac{3}{5}$ the length of head. Caudal rounded. Yellowish, marbled or barred with dark brown; fins sometimes with small dark spots.

New Zealand.

| | | |
|-----------------------------------|--------------|----------------|
| 1. (135 mm.) type of the species. | New Zealand. | Sir G. Grey. |
| 2. (114 mm.) | Hokatika. | Otago Mus. |
| 3-6. (67-88 mm.) | " | E. Hill, Esq. |
| 7. Skeleton. | " | " |
| 8. (127 mm.) | — | Sir D. Cooper. |

EXPLANATION OF THE PLATES.

PLATE X.

- Fig. 1. *Galaxias affinis*, p. 380.
 2. " *huttoni* ($\times 2$), p. 373.
 3. " *punctifer* ($\times 1\frac{1}{2}$), p. 367.
 4. " *lynx*, p. 373.

PLATE XI.

- Fig. 1. *Galaxias weedoni*, p. 377.
 2. " *waitii*, p. 376.
 3. " *olidus* (type of *G. kayi*), p. 381.
 4. " *occidentalis*, p. 376.

PLATE XII.

- Fig. 1. *Galaxias attenuatus* (type of *G. punctatus*), p. 368.
 2. " *coxii*, p. 380.

PLATE XIII.

- Fig. 1. *Galaxias auratus*, p. 379.
 2. " *attenuatus* (type of *G. krefftii*), p. 368.
 3. " *findlayi*, p. 382.
 4. " *truttaceus*, var., p. 378.

5. The Mammalian Fauna of China.—Part I. *Murine*.

By J. LEWIS BONHOTE, M.A., F.L.S.*

[Received October 28, 1905.]

The object of a proposed series of papers, of which this is the first, is to bring up to date our existing knowledge of the Mammalian Fauna of China, at present scattered throughout various papers, which, except Mons. Milne-Edwards's 'Recherches Mammifères,' are short.

The material used has been chiefly that contained in the British Museum, which, apart from a portion of Swinhoe's collection, contains large collections made by Messrs. Styan, Rickett, and La Touche, as well as several smaller collections, amongst which we may mention a small consignment very carefully collected by Mr. E. B. Howell.

I have to thank the late Dr. E. Oustalet for his kind courtesy and the facilities afforded me for a careful examination of Père David's types in the Paris Museum.

Many imperfections due to lack of specimens and exact data are bound to occur, but it is hoped that these papers may prove useful as a foundation on which future workers may build, and with this object in view the synonymy throughout has been made as full and accurate as possible.

List of Chinese *Murine*.

1. *Mus edwardsi* Thos.
2. *Mus coxingeri* Swinh.
3. *Mus confucianus* A. M.-E.
4. *Mus huang*, sp. n.
5. *Mus ling*, sp. n.
6. *Mus latouchei* Thos.
7. *Mus flavipectus* A. M.-Edw.

* [The complete account of the new species described in this communication appears here; but since the names and preliminary diagnoses were published in the 'Abstract,' the species is distinguished by the name being underlined.—EDITOR.]

8. *Mus losea* Swinh.
9. *Mus griseipectus* A. M.-E.
10. *Mus norvegicus* Exrl.
11. *Mus humiliatus* A. M.-E.
12. *Mus musculus* Linn.
13. *Micromys sylvaticus chevrieri* A. M.-E.
14. *Micromys sylvaticus draco* Barr.-Hamilton.
15. *Micromys minutus pygmaeus* A. M.-E.
16. *Micromys agrarius manchuricus* Thos.
17. *Micromys agrarius ningpoensis* Swinh.

MUS EDWARDSI Thos.

Mus edwardsi Thos. P. Z. S. 1882, p. 587, pl. xliv.; Thos. P. Z. S. 1898, p. 773; Bonh. Fasc. Malayenses, Zool. vol. i. pp. 33 & 36 (1903).

This species was originally described from four examples sent to Paris by Père David. The type is in the B.M. 82.6.16.1, the other three examples being in Paris and dated October 1872. This is a very large Rat belonging to the *jerdoni* group, of which it is typical of the subgroup bearing its name. The British Museum now possesses a fine series of these Rats from Kuatun in N.W. Fokien. They seem to be very uniform and show remarkably little variation.

The general colour is yellowish grey, some specimens being much yellower than others. Each hair is slate-grey at its base and fulvous for the distal half, and interspersed among these hairs are long slender spines with dark tips as well as long black bristles. On the flanks, owing to the absence of the black bristles, the fulvous colour of the fur proper is more visible.

The under parts are pure white. The tail is equal in length to the head and body, markedly bicolor, and covered with short hairs, while the last two or three inches are pure white. The feet are uniform dark brown with white margins and toes. Whiskers very long and entirely black with the exception of a few shorter white ones.

The *skull* partakes of the usual characters associated with the *jerdoni* group, *e. g.*, long, narrow, flat, and with small bullæ. The supraorbital ridges are well defined over the orbits and slightly flattened so as to produce a comparatively broad upper surface; they end somewhat abruptly about halfway across the parietals. Below, owing to the smallness of the bullæ, the basioccipital presents a broad surface and the external condyles are well developed.

The *dimensions* (as given by Thomas and rendered into millimetres) are as follows:—Head and body 300; tail 289; hind foot 57; ear 24.

Skull. Greatest breadth 57 mm.; basilar length 44; palatal length 24.5; diastema 15; incisive foramina 10; length of nasals 22.5; zygomatic breadth 26; interorbital breadth 9.5; breadth of brain-case 22; length of molar series (alveoli) 11.

Habitat. Only recorded from W. and N.W. Fokien.

The first specimens of these Rats were all obtained high up on the mountains among rocky ground, in the crevices of which it lives. Beyond this, nothing is known of its habits. It has only been taken in W. and N.W. Fokien.

MUS COXINGI Swinhoe.

Mus coninga Swinhoe, P. Z. S. 1864, pp. 185, 382.

Mus coxinga Swinhoe, P. Z. S. 1870, p. 637; Thos. Ann. Mus. Gen. 1892, p. 939 (footnote).

Mus coxingi Swinhoe, Bonh. Fasc. Malay., Zool. vol. i. pp. 33 & 36 (1903).

Mus coninga (under which name it was originally described by Swinhoe) is undoubtedly a Rat of the *jerdoni* type (*rajah* subgroup), and not the *jerdoni* subgroup as noted by me. The typical form, as described by Swinhoe, has the upper parts reddish brown, sprinkled with stiff black bristles, especially on the back, where the fur is also often a little darker. Under parts pure white; feet white; tail bicolor, white at the tip.

The skulls at my disposal are too fragmentary to allow of a description.

Dimensions (from skin). Head and body 208 mm.; tail 180; hind foot 36.

Skull. Palatal length 19 mm.; diastema 11; incisive foramina 7; length of nasals 17; interorbital breadth 6.5; length of molar series (alveoli) 8 mm.

Habitat. Formosa.

Swinhoe noted many varieties of this species as occurring in Formosa; these doubtless represent forms belonging to the different subgroups of the *jerdoni* group, but unfortunately the only specimens I have been able to examine are a portion of Swinhoe's series of which the skulls are all defective. It is therefore impossible to distinguish any of these varieties by name; but the true *coxingi* may be distinguished by its white feet, the white tip to its tail, and the fact that the fur is thickly beset with spines.

MUS CONFUCIANUS A. M.-E.

Mus confucianus A. M.-Edwards, Nouv. Arch. du Mus. vii. p. 93 (1871); id. Rech. Mamm. p. 286, pl. xli. fig. 2 (1874); Thos. P. Z. S. 1898, p. 773 (partim); Bonh. Fasc. Malay., Zool. vol. i. p. 33.

General colour above dark brown (clay, Ridgw.), shading to pale buff or yellowish on the flanks. Fur slate-grey at the base with pale fulvous tip, interspersed amongst which are long black bristles. The pale tips predominate over the black so as to give the animal the appearance noted above. Occasionally these bristles are semi-spinous, and in one or two examples the fur is exceedingly harsh and spiny; but as a rule it is quite soft to the

touch, as stated by M. Milne-Edwards in the original description. Under parts pure milk-white, sharply contrasted with that of the upper parts. Feet whitish, but the colour of the upper parts runs down the centre of their upper surface to a varying extent. Tail moderately long and bicoloured, clothed with short hairs; its terminal portion is usually, but not invariably white. The skull is that of a typical *Mus* of the *jerdoni* group, being long and narrow, somewhat flattened and with small bullae.

Dimensions (in flesh). Head and body 164 mm.; tail 192; hind foot 39; ear 18.

Skull (average dimensions). Greatest length 36 mm.; basilar length 27.5; palatal length 15; diastema 9.75; incisive foramina 6.6; length of nasals 13.6; zygomatic breadth 16; inter-orbital breadth 6; greatest breadth of brain-case 14; length of molar series (alveoli) 6.

Habitat. The type was received from Père David from the mountains of Moupin, in the province of Szechuen, W. China. There are also specimens in the Museum from E. Kiangsi, from Kuatun and Ching Fen Ling in N.W. Fokien, and from Nankin, all forming a very uniform series showing hardly any variation.

It is as a rule generally found in the mountainous country, occasionally entering the houses in winter; and it may be easily recognised, for its dull brown colour and *pure white* under parts, sharply divided from the colour of the back, form a combination of characters found in no other Rat from that part of the world.

Some of the spiny individuals very closely resemble *Mus niveiventris* from the Himalayas, of which it is probably the Chinese representative.

MUS HUANG.

Mus confucianus A. M.-E., O. Thos. P. Z. S. 1898, p. 773 (partim).

Mus huang Bonh. Abstr. P. Z. S. No. 23, p. 19, Dec. 5, 1905.

Size as in the last-mentioned species. General colour rufous (ochraceous-rufous, Ridgw.), darker along the dorsal area. The underfur is slate-coloured at its base with a rufous tip, thickly intermixed, especially on the back, with black bristles or spines. On the flanks the bristles become much less numerous and many of them have rufous tips. The colour of the head resembles that of the upper parts. The feet are whitish, with the rufous colour running down the centre of their upper surface. Under parts pure white, the line of demarcation being sharply defined. Tail rather longer than the head and body, clothed with short hairs and bicolouration. Ears moderately long and sparsely covered with very close, short, dark brown hairs.

The *skull* very closely resembles that of *M. confucianus* in size and general appearance, but may be recognised by the supra-orbital ridges being continued right across to the posterior margin of the parietal.

Dimensions (of type from skin). Head and body 155 mm.; tail 188; hind foot 30; ear (approx.) 16.

Skull (of type). Greatest length 37 mm.; basilar length 27; palatal length 15; diastema 9.5; incisive foramina 7; length of nasals 14; interorbital breadth 6; greatest breadth of brain-case 14; length of molar series (alveoli) 6.

Type. B.M. 89.11.1.16. ♂ ad. Collected on the 24th April, 1898, at Kuatun, N.W. Fokien, by Mr. J. D. La Touche.

Habitat. Kuatun. The Museum also contains a specimen indistinguishable from the type from the Ngau-tchi-lea Mts., Hainan.

This species is evidently the representative of the true *Mus jerdoni*, although it is more spiny than the other members of that subgroup hitherto described. Its nearest ally is *Mus rapit*, mihi, from Borneo, to which it bears a very close resemblance. From *Mus confucianus* it may be easily distinguished by its bright coloration, the absence of any white tip to the tail, and also the very much shorter hairs with which the tail is clothed.

I have called this species from its Chinese name "Huang mao shū," meaning yellow-haired rat.

MUS LING.

Mus confucianus A. M.-E., O. Thos. P.Z.S. 1898, p. 773 (partim).

Mus ling Bonh. Abstr. P.Z.S. No. 23, p. 19, Dec. 5, 1905.

Size smaller and paler, otherwise closely resembling *Mus huang*. The amount of spininess varies considerably, some individuals being very thickly beset, while in others the fur is uniformly soft. The tail is covered with short hairs and bicoloured as the *Mus huang*, but in the young and in some adult individuals we find a tendency to a unicolorous tail. The general colour is fulvous (ochraceous-buff, Ridgw.).

Skull. Except for its smaller size, the skull does not differ markedly from that of *Mus huang*. The ridges referred to in that species may be traced as far back as the posterior margin of the parietal, but are not so strongly marked. Several skulls, however, are intermediate in size between those of this species and those of *Mus huang*, but this Rat may in all cases be distinguished externally by its paler colour and shorter tail; while in no case does any single measurement overlap that of the smallest *M. huang*.

Dimensions (of type from skin). Head and body 132 mm.; tail 157; hind foot 27; ear 15.

Skull (of type). Greatest length 33 mm.; basilar length 25; palatal length 14; diastema 8.5; incisive foramina 5.5; length of nasals 12; zygomatic breadth 14; interorbital breadth 5.5; greatest breadth of brain-case 14; length of molar series (alveoli) 5.5.

Type. B.M. 98.3.7.8. Collected by Mr. C. B. Rickett in December 1897, at Ching Fen Ling, N.W. Fokien.

Habitat. Ching Fen Ling, N.W. Fokien; it also occurs at Kuatun in the same province.

This species is the representative of the *cremoriventer* subgroup.

In external appearance it resembles *Mus cremoriventer* Mill. very closely; the bicoloured tail, however, serves as an easily distinguishable feature, but that it is very nearly related is shown by the tendency in the young and even some adults to the unicolorous tail. The immature pelage is, as a rule, soft and destitute of bristles, and resembles in colour true *M. confucianus*.

This species seems to be most abundant at Ching Fen Ling, but it also occurs at Kuatun.

MUS LATOUCHEI Thos.

Mus latouchei Thos. Ann. & Mag. N. H. ser. 6, vol. xx. p. 113 (1897); id. P. Z. S. 1898, p. 772; Bonh. Fasc. Malay., Zoology, vol. i. p. 34 (1903).

General colour of the upper parts clear grizzled grey. Fur light at its base, with a greyish-brown subterminal portion and white tip, thickly intermixed with soft spines similar in colour but lacking the white tip. Under parts pure white, the hairs being white to their bases. Hands and feet white along their margins and on the digits, brownish in the centre. Tail dark, covered with short hairs, white at the tip in some individuals. Ears large, rounded and almost naked.

The skull most nearly resembles that of *Mus bowersi*, from which it differs, according to Mr. Thomas, in having the line of the fronto-premaxillary and fronto-nasal suture running straight from side to side, instead of being bowed backwards, and the supra-orbital rims more developed. The incisors are broad and pale yellow.

Dimensions (of type from skin). Head and body 310 mm.; tail 290; hind foot 60.

Skull. Greatest length 58 mm.; basilar length 48; palatilar length 28; diastema 17; length of incisive foramina 11; length of nasals 23.5; interorbital breadth 8; breadth of brain-case 22; length of molar series 10.

Habitat. The type came from Kuatun, as do all the series of specimens that have hitherto been obtained, although Mr. Thomas mentions a specimen in the Paris Museum from Père David. It is evidently a scarce Rat, and little seems to be known of its habits, but according to Mr. La Touche it inhabits the forest country. Its uniform grizzled-grey colour and large size are sufficient to distinguish it from all other Chinese rats.

MUS FLAVIPECTUS A. M.-E.

Mus — ? Swinhoe, P. Z. S. 1864, p. 382. no. 26.

Mus canna Swinhoe, P. Z. S. 1870, p. 636.

Mus alexandrinus Geoffr., Swinhoe, P. Z. S. 1870, p. 635.

Mus flaripectus A. M.-E. Nouv. Arch. du Mus. vol. vii. p. 93 (1871); id. Rech. Mamm. p. 289, pl. 42. fig. 1 (1874); Bonh. Fasc. Malay., Zoology, vol. i. pp. 35 & 37.

Mus ouangthomae A. M.-E. Nouv. Arch. du Mus. vol. vii. p. 93 (1871); id. Rech. Mamm. p. 290, pl. 40. fig. 3 (1874).

Mus plumbeus A. M.-E. Rech. Mamm. p. 138, pl. 43. fig. 2 (1874).

Mus rattus flavipectus A. M.-E., Thos. P. Z. S. 1898, p. 772.

This species is the representative of the *rufescens*-group of *Mus rattus*, which inhabits China. It is of moderate size, having the tail rather shorter than the head and body. Fur soft and destitute of spines. General colour above uniform yellowish brown, slightly lighter on the flanks. Hairs slate-coloured at their base, with ochreous tips, and intermixed among these are pure black hairs of a finer texture. Under parts varying from dirty yellowish to yellowish-white, often, but not invariably, showing traces of a white mark on the breast. The hind feet are whitish and the hands dark brown margined with white. Tail unicoloured and covered with hairs.

Skull. The skull is that of a fairly typical *Mus rufescens*, and, except in its slightly smaller size, is indistinguishable from the Indian form*.

Dimensions. Head and body 200 mm.; tail 160; hind foot 31; ear 18.

Skull†. Greatest length 41 mm.; basilar length 36.5; palatilar length 20; diastema 11.5; length of incisive foramina 8; length of nasals 15; zygomatic breadth 20; interorbital breadth 6; breadth of brain-case 15.5; length of molar series 7.

Habitat. The type of this species came from Moupin in W. Szechuen, but it also occurs at Kuatun in N.W. Fokien, Kiou Kiang in Kiangsi, and Foochow, so that it is probably widely distributed throughout the country. It also occurs in Formosa.

This and *Mus griseipectus* are the common Rats of China. The difference in the colour of the under parts, as denoted in their specific names, will form to some extent a distinguishing character, although the under parts in *flavipectus* often become very light, and in old specimens of *griseipectus* may show a yellowish tinge. However, I am inclined to think this character unreliable, and a much better test is the greater size of *griseipectus*, as shown by the length of the hind foot and skull-measurements. In *griseipectus*, moreover, the tail, although it can hardly be called "bicolor," is distinctly lighter on its under surface, and this seems to be the only reliable external characteristic at all ages.

In the description of *M. flavipectus* in the Rech. Mamm., M. Milne-Edwards adds a footnote to say that *M. germaini* from Pulo Condor closely resembles this species, especially in its coloration. Although approximately correct, it may be well to notice that *M. germaini* may be distinguished by its size, which

* For careful figure of the skull of *M. rufescens*, see paper by the author, Fasc. Malayenses, Zoology, vol. i. pl. iv. fig. 3 (1903).

† The measurements, which are the same as those taken in my former paper, are now called after Mr. O. Thomas's scheme for cranial measurements, published Proc. Biol. Soc. Wash. vol. xviii. p. 191 (1905), the alterations (in name only) being basilar and palatilar for basal and palatal.

is greater than that of *M. griseipectus*. The ears are longer, and the colour of the under parts, which is white, differs from that of both *M. flavipectus* and *M. griseipectus* by the fact that the hairs are white to their bases and not slate-coloured.

When working out Père David's collection from Moupin, M. Milne-Edwards described a species under the name of *M. ouangthomae*, stating that it was distinguished by a pure white cross on the breast. It was described from a single specimen, which, by the kindness of Dr. Oustalet, I had the privilege of examining when in Paris, and I am of opinion that it is merely a $\frac{3}{4}$ -grown example of this species. The white cross is not so conspicuous as one would be led to infer from the description, and is merely a well-marked development of the white breast-mark which is found in many individuals of otherwise typical *flavipectus*.

Another species from the collection of Père David was described by M. Milne-Edwards under the name *M. plumbeus*, and figured in the Rech. Mamm. This specimen I have also had an opportunity of examining, and the coloration depicted in the plate is much too blue. There is a specimen in the British Museum which agrees tolerably well with the description and type of *M. plumbeus*, but on examination of the skull it proves to be a very young individual, probably belonging to *M. flavipectus*.

The latter is the only specimen I have seen that shows white incisors, a characteristic of *M. plumbeus*. Under these circumstances, and as the skull of the type of *M. plumbeus* cannot be examined, as it has not been removed from the skin, we must, in the absence of further evidence, consider *plumbeus* as founded on an immature *flavipectus*.

MUS LOSEA Swinhoe.

Mus flavescens Elliot, Swinhoe, P. Z. S. 1864, p. 186.

Mus rufescens Gray, Swinhoe, P. Z. S. 1870, p. 636.

Mus losea Swinhoe, P. Z. S. 1870, p. 637.

This species may best be described as a small form of *M. flavipectus*, to which it closely approaches in coloration. The under parts are, however, as a rule greyer. The tail is unicoloured and very finely annulated (the annuli being 14 to the cm. as against 12 in *flavipectus*), and covered with minute and almost invisible setæ.

The ear is elongated, being longer by 2 mm. than immature *flavipectus* of the same size.

The skull, except in being $\frac{4}{5}$ the size, is otherwise indistinguishable.

Dimensions (from skin). Head and body 150 mm.; tail 123; ear 18; hind foot 26.

Skull. Greatest length 32 mm.; basilar length 26; palatilar length 15; diastema 8; incisive foramina 6.5; length of nasals 12; zygomatic breadth 15; interorbital breadth 5; length of molar series 6.5; breadth of brain-case 14.

Habitat. This species was originally described from Tamsuy in Formosa. But there is also a specimen collected by Mr. Swinhoe at Amoy, and other specimens in the Museum from W. Fokien.

This is undoubtedly a small form of *M. flavipectus*, distinguishable, apart from its size, by the more elongated ear and finer annulations to the tail.

It is possible that the original *losea* from Formosa may prove to be different from the form inhabiting the mainland; and this is the more likely, as in the paper describing the original *losea* Mr. Swinhoe referred to the specimen from Amoy as *Mus rufescens*. For the present, however, owing to lack of material, I have no alternative but to consider them all as *losea*.

MUS GRISEIPECTUS A. M.-E.

Mus indicus Geoffr., Swinhoe, P. Z. S. 1870, p. 635.

Mus griseipectus A. M.-E. Nouv. Arch. Mus. 1871, p. 93; id. Rech. Mamm. p. 290, pl. 42. fig. 2 (1874).

Similar to *M. flavipectus*, but slightly larger. Tail about equal in length to the head and body. Fur soft and destitute of spines. General colour above yellowish brown; fur slate-grey at base, with yellowish tips, and thickly interspersed among these are longer thin black hairs, which predominate along the median dorsal area. Upper surfaces of the feet and hands white. Under parts white or greyish, the fur being dark at its base as in the upper parts.

Skull. The skull, except in being slightly larger, closely resembles that of *M. flavipectus*, and calls for no special comment.

Dimensions. Head and body 196 mm.; tail 160; hind foot 33; ear 22.

Skull. Greatest length 45 mm.; basilar length 36; palatilar length 22; diastema 13; length of incisive foramina 8; length of nasals 17; zygomatic breadth 21.5; interorbital breadth 7; breadth of brain-case 18; length of molar series 8.

Habitat. Sze-chuen (type-locality); also found in W. Fokien.

There is but little further to add with regard to this species. It is most likely to be confused with *M. flavipectus*, but the characters distinguishing it from that species have already been given. There is, however, another small character which it may be as well to notice. In *M. flavipectus* the hands on their upper surfaces are brown margined with white, while in all the specimens of *griseipectus* that I have examined the upper surfaces of the hands are uniformly white.

MUS NORVEGICUS Erxl.

Mus decumanus Pall., Swinhoe, P. Z. S. 1864, pp. 186, 382; id. op. cit. 1870, pp. 233, 635.

Mus humiliatus A. M.-E., Thos. P. Z. S. 1898, p. 772 (partim).

The common Norway Rat occurs not infrequently in China, as shown by several examples in the British Museum. Apart from the skull-characters, which are quite distinctive, it may be recognised from *griseipectus*, which it resembles most closely externally, by its larger size (hind foot 36 mm.) and stouter tail.

MUS HUMILIATUS (A. M.-E.).

Mus humiliatus A. M.-E., Ann. Sci. Nat. vii. p. 375 (1867); id. Rech. Mamm. p. 137, pl. 41. fig. 1 (1874); Rhoads, Proc. Acad. Nat. Sci. Philad. 1898, p. 121; Thos. P. Z. S. 1898, p. 772.

Another member of the *Mus rattus* group but smaller. General colour above yellowish-brown. Fur slate at its base, but yellowish brown (cinnamon, Ridgw.) for the greater part of its length, becoming paler on the flanks; intermixed with the fur are a few long soft black hairs, but they are so scattered as to have but little effect on the general colour. The hands and feet are white, and the under parts uniform grey. The tail is short, tapering, and bicoloured, well clothed with short hairs that are brown on the upper and white on the lower surface. The ears small and rounded and covered with fine hairs.

The skull differs from that of *M. griseipectus* in being broader and shorter. The supraorbital ridges are not so well marked and do not run back so far, disappearing about halfway across the parietals.

Dimensions (taken in flesh: Nankin *). Head and body 145 mm.; tail 115; hind foot 30; ear 16.5.

Skull (of co-type). Greatest length 35 mm.; basilar length 29; palatilar length 17; diastema 7; length of incisive foramina 6; length of nasals 12; zygomatic breadth 18; interorbital breadth 6; breadth of brain-case 15; length of molar series 7.

Habitat. Pekin and neighbourhood (type); Nankin and W. Fokien.

The chief distinctive feature of this Rat is its light colour, caused by the almost entire absence of the longer black hairs found in so many species, and besides this its smaller size and short tail form a combination of characters enabling it to be easily recognised. It is apparently a scarce animal, as only one specimen has reached the British Museum during the last 23 years, and it is entirely absent from the collections of Messrs. Styan, Rickett, and La Touche. Mr. Howell has, however, just sent over a small collection, which contains a mature female, from the city of Nankin, this specimen agreeing closely in all respects with the type.

A specimen received originally from the Paris Museum as belonging to this species, and collected by Père David in W. Fokien, is undoubtedly *Mus norvegicus*, and it was this example that led Mr. Thomas to suggest *Mus humiliatus* as the possible wild stock of *Mus norvegicus*.

* The skull-measurements of this specimen practically coincide with those of the co-type.

Key to the larger Chinese Species of Mus.

(Hind-foot measurement of the smallest, 26 mm.).

- A. Colour of under parts sharply divided from that of upper parts.
- a. Size large. Hind foot 57 mm. *M. edwardsi*.
 - b. Smaller. Hind foot not exceeding 36 mm.
 - a₁. Feet white *M. coxingi*.
 - b₁. Feet coloured.
 - a₂. General colour dull brown (clay, Ridgw.). Hind foot 39 mm. *M. confucianus*.
 - b₂. General colour brighter (ochraceous rufous, R.). Hind foot 30 mm. *M. huang*.
 - Smaller and paler. Hind foot 27 mm. *M. ling*.
- B. Colour of under parts not sharply divided from that of upper parts.
- a. Tail bicolor. Hands white.
 - a₁. Tail clothed with minute setæ. Hind foot 33 mm. *M. griseipectus*.
 - b₁. Tail clothed with hairs.
 - a₂. Large. Hind foot 36 mm. *M. norvegicus*.
 - b₂. Smaller. Hind foot 30 mm. *M. humilatus*.
 - b. Tail unicoloured. Hands brown with white margins.
 - a₁. Fur of under parts with slate-coloured bases.
 - a₂. Size large. Hind foot 31 mm. *M. flavipectus*.
 - b₂. Smaller. Hind foot 26 mm. *M. losca*.
 - b₁. Fur of under parts white throughout. Hind foot 60 mm. *M. latouchi*.

MUS MUSCULUS L.

Mus musculus L., Swinhoe, P. Z. S. 1864, p. 382, and 1870, p. 637.

The common House-Mouse does not seem to be very abundant in China, though there are several specimens in the Museum from widely separated localities in that country.

A description of so well known a species would be superfluous, and there is no other mouse with which it could well be confused.

Dimensions (from spirit-specimen). Head and body 77 mm.; tail 80; hind foot 17.

MICROMYS Dehne.

Micromys (type of genus *Micromys agilis*, Dehne, Hoflössnitz, 1841), revived by O. Thomas, Ann. Mag. N. H. ser. 7, vol. xv. p. 491 (May 1905).

Mr. Thomas has used *Micromys* as the generic name of several species of the smaller mice hitherto included under the universal genus "*Mus*." The Chinese forms belonging to it are:—

Mus sylvaticus chevrieri.

" " *draco*.

Mus minutus pygmaeus.

Mus agrarius manchuricus.

" " *ningpoensis*.

The distinctive character of this genus is that the posterior

laminae of the first and second upper molars have each an additional internal cusp beyond the number present in *Mus*, so that, counting along the inner side of the tooth-row, there are three cusps on both the first and second molars.

MICROMYS SYLVATICUS CHEVRIERI (A. M.-E.).

Mus chevrieri A. Milne-Edwards, Rech. Mamm. p. 288, pl. xl. fig. 2 (1874); E. Büchner, Mamm. Przewalski, p. 92 (1889).

Mus sylvaticus chevrieri (A. M.-E.), Barrett-Hamilton, P. Z. S. 1900, p. 418.

Major Barrett-Hamilton, in the paper noticed above, restricts the name *chevrieri* to that form of *Micromys sylvaticus* represented by the typical series from Moupin in Tibet.

The general colour is pale fawn, grizzled with brownish on the back. The under parts and feet are pure white. Tail about equal in length to the head and body, bicoloured and scantily clothed with hair.

Dimensions. Head and body 100 mm.; tail 90; hind foot 21.5 mm.

Habitat. Moupin, Tibet. A single specimen in the British Museum from S. Shensi is probably referable to this species.

So little is known of this species that it is impossible to add anything in reference to its habits, &c.

MICROMYS SYLVATICUS DRACO (B.-H.).

Mus chevrieri A. M.-E., Thos. P. Z. S. 1898, p. 773.

Mus —, sp. no. 27, Swinhoe, P. Z. S. 1864, p. 382.

Mus sylvaticus draco Barrett-Hamilton, P. Z. S. 1900, p. 418.

Mus badius Blyth, Swinhoe, P. Z. S. 1870, p. 233.

This form of *Mus sylvaticus* described by Major Barrett-Hamilton may be distinguished from *Micromys chevrieri* by its duller colour and its slightly smaller size. The general colour is pale fulvous (hair-brown, Ridgw.), darker along the median dorsal area owing to many of the hairs having black tips. Feet and under parts pure white. Tail well clothed with short hair, dark above and light below. The bases of the hairs on all parts of the body are slate-coloured.

According to the original describer, the skull is "narrower and slightly smaller than that of the adult of the subspecies *intermedius* (of Britain and portions of Western Europe), and having the anterior portions of the frontals more attenuated and the nasal region proportionately more slender than in the latter subspecies."

Dimensions. Head and body 91 mm.; tail 95; hind foot 20.

Skull. Greatest length 26 mm.; basilar length 21; palatilar length 11; diastema 7; length of incisive foramina 5; length of nasals 10; interorbital breadth 5; breadth of brain-case 11; length of molar series 4.

Habitat. Kuatun, N.W. Fokien.

The typical series, all from Kuatun, are the only ones at present known.

MICROMYS MINUTUS PYGMÆUS (A. M.-E.).

Mus pygmæus A. M.-Edw. Rech. Mamm. p. 291, pl. xliii. fig. 1 (1874); Thos. P. Z. S. 1898, p. 775.

Mus minutus pygmæus B.-Hamilton, Ann. & Mag. N. H. ser. 7, vol. iii. p. 343 (1899).

This is the Chinese representative of our European Harvest-Mouse, from which it differs in its rather longer tail and darker colour. The general colour above is of a uniform olive-brown, rather more rufous on the hind-quarters. The under parts are greyish white. Hands and feet scantily clothed with brownish hair. Tail equal in length or longer than the head and body, clothed with minute and almost invisible setæ.

The skull, which is typical of the genus, has a moderately broad brain-case, but is rather short in the muzzle. The bullæ are large for the size of the skull, and project sharply downwards, compressing the basioccipital at its anterior portion.

Dimensions of a dried skin from Kuatun. Head and body 58 mm.; tail 61; hind foot 14*.

Skull. Greatest length 19 mm.; basilar length 17; palatilar length 8; diastema 5; length of incisive foramina 3·6; length of nasals 6; interorbital breadth 3·7; breadth of brain-case 9; length of molar series 3·8.

Habitat. Sze-chuen. Specimens in the British Museum from Kuatun and Shanghai.

Nothing further is known of the distribution or habits of this species. The Japanese Harvest-Mouse recently described by Mr. Thomas is more rufous and resembles the European one more closely than the Chinese.

MICROMYS AGRARIUS MANCHURICUS (Thos.).

Mus agrarius manchuricus Thos. P. Z. S. 1898, p. 774.

This is the Northern Chinese form of *Mus agrarius*, from typical examples of which it differs only to a slight extent. It is slightly larger and more rufous in its general tone of colour. The dark median dorsal stripe is black and very clear cut, and starting from the crown reaches to the root of the tail. Under parts grey with a tinge of rufous along the middle line. Tail dark brown above, lighter below, well covered with short hairs.

The *skull* does not materially differ from that of *M. agrarius typicus*.

Dimensions (of type after Thos.). Head and body 116 mm.; tail 78; hind foot 19; ear 14.

* The measurements of the type as given by M. M.-Edwards are: head and body 73, tail 53, ear 5, hind foot 18; but on the discrepancies between the tail and hind-foot measurements see O. Thomas, *loc. cit. supra*.

Skull. Greatest length 27 mm.; palatilar length 12; diastema 8; length of incisive foramina 6; length of nasals 10; interorbital breadth 4; breadth of brain-case 11; length of molar series (alveoli) 4.

Habitat. The type comes from near the Korean border of Manchuria. The British Museum contains a further specimen from S. Shensi procured by Père David, which has been referred to this race.

MICROMYS AGRARIUS NINGPOENSIS Swinh.

Mus ningpoensis Swinh. P. Z. S. 1870, p. 637 et 1872, p. 818.

Mus harti Thos. P. Z. S. 1898, p. 774.

Very similar to *M. a. manchuricus*, but lacking the rufous tinge on the back, which in the present species is replaced by fulvous. General colour above fulvous throughout, uniformly grizzled with black. In some cases a well-defined dark stripe is apparent down the back, and in most specimens a trace of a dark stripe is discernible. Under parts white, sharply defined from the colour of the upper parts. Tail brown above, lighter below, and covered with short hairs.

The *skull* does not appreciably differ from that of *M. agrarius typicus*.

Dimensions (of type converted from inches given in Swinhoe's description). Head and body 81 mm.; tail 68; hind foot (measured from type) 20.

Another example, ♂ (in flesh, coll. E. B. Howell, no. 69). Head and body 111 mm.; tail 78; hind foot 20; ear 14.

Skull. Greatest length 26 mm.; basilar length 21·5; palatilar length 11; diastema 7; length of incisive foramina 5; length of nasals 10; zygomatic breadth 12; interorbital breadth 4·7; breadth of brain-case 11·5; length of molar series 4.

Type. Collected by Mr. Swinhoe. Now in the Berlin Museum.

Habitat. Ningpo. The British Museum contains specimens also from Nankin, Hanchow, and Kuatun.

I have had to sink, under Swinhoe's name, Mr. Thomas's *Mus harti*, as there can be no doubt as to its identity with *ningpoensis*. Since the description of *Mus harti* was written, a fine series has been received from the neighbourhood of Nankin, collected by Mr. Howell. It appears that although the dorsal stripe is as a rule faint and indistinct, it is in some cases deep black and very well marked, while in other individuals no trace of it can be found.

Herr Matschie (*in litt.*) states that in the type of *ningpoensis* there is no trace of the dorsal stripe, and the same is the case with the type of *M. harti*.

Little is known of its habits; Mr. Howell seems to have trapped most of his specimens on open ground in the vicinity of water.